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Analysis of Activity Improvement and Student learning Outcomes on Salt Hydrolysis through Discovery Model Learning

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Abstract. This research is a quantitative descriptive study that aims to analyze the increase in activity and learning outcomes of salt hydrolysis of Class XI MIPA students at SMA Negeri 11 Makassar through discovery learning model. The types of activities that are used as indicators are visual, writing, oral, listening and mental activity. Learning outcomes are seen from five indicators, namely: 1) Understanding the principle of the hydrolysis reaction, 2) Analyzing salts that undergo hydrolysis, 3) Writing the hydrolysis reaction equation, 4) Determining the hydrolysis constants and pH of the hydrolyzed salt solution, and 5) Determining the graph the relationship between changes in pH value in acid-base titrations to explain the nature of the hydrolyzed salt. Research data obtained through observation of learning activities during learning process and evaluation at the end of each lesson of salt hydrolysis. The results shows that students' learning activities other than oral and listening activity are in the very active category in all syntax, but for oral and listening activities in data processing syntax and proof that initially in the active enough category, each meeting has increased into a category active at the next meeting. Likewise, learning outcomes have increased from each meeting by 14%. The indicators of salt hydrolysis that experience completeness are the first, the fourth and the fifth indicators.

Keywords: discovery learning model, learning activities, learning outcomes, salt hydrolysis

1. Introduction

The learning process really requires both physical and mental activity. Learning without activity, of course, the learning process may not take place optimally. In the process of learning activities, all aspects of students must be involved, both physical and spiritual so that behavior changes can change quickly, precisely, easily and correctly, both related to cognitive and psychomotor aspects.

Learning activates students has been clearly defined in the 2013 Curriculum which accommodates active learning through recommendations and recommendations for the use

of various learning models, learning process activities are assessed authentically and learning outcomes are complete. Learning activities and student learning outcomes can be achieved by applying learning models including inquiry, discovery, and problem-based or project models.

Discovery learning model consists of six syntax, namely stimulus, problem identification, data collection, data processing, verification, and generalization. During the learning process, the role of the teacher is needed to direct students so that the learning objectives can be discussed by all groups so that not a single indicator of learning achievement escapes their discussion. Especially in drawing conclusions a teacher must prepare accurate and clear. The implemented the discovery learning model , special for chemistry teachers still rely on learning using a direct model which is dominated by light and learning centered on teacher. As a result, the opportunity for students is very minimal to express ideas or ideas through learning activities such as discussing, determining their own main thoughts. Students already feel safe if all the material is delivered by the teacher. In this regard, chemistry taught in high school is a science that is obtained and developed based on [1] which seek answers related to natural phenomena, so it is always necessary to involve skills and reasoning that are applied through activities in the learning process. It is known that the content of chemistry in the form of concepts, laws and theories is basically a product of a series of processes using a scientific attitude.

The concepts in chemistry are generally complex and abstract. Concepts that are abstract tend to have the potential to cause learning difficulties and become the cause of misunderstanding of students' concepts [2]. Based on information from the chemistry teacher at SMA Negeri 11 Makassar for the 2019/2020 school year in class XI MIA, the activeness of students to be involved in answering or expressing opinions or answering questions is very low, even though it has been appointed directly by the teacher. Most of them are more likely to be active when given group assignments to do at home. Moreover, if the assignment is for chemistry students, they are unhappy because they find chemistry lessons difficult to understand because they only contain calculations and are about concepts that require understanding but are difficult to learn on their own without teacher guidance. Based on this information, it is necessary to teach them a learning model that involves students discussing and finding their own concepts, so a discovery learning model is chosen. With this model, student can be find concept than gave good interest to increase they result study [3], [4] or their chemistry learning outcomes will be better because their chemistry learning outcomes for salt hydrolysis only 34% or very low [5]. This situation is supported by the results of research on the activeness of students during chemistry learning which is very less due to the learning process which is dominated by teachers who use the direct learning model with the lecture method.

The active thinking and working of students can be assisted by a learning model that involves students discussing in large groups or in small groups by using student's worksheet [6]. Discovery learning model as a teaching procedure that emphasizes teaching, individual, object manipulation and experiment before getting to generalization so that this model includes components of educational practice which includes teaching methods that promote active learning, process-oriented, self-explanatory, self-seeking, and reflective, thus making students think more critically [7]. The discovery learning model or method is a series of learning activities that maximally involves all students' abilities to search and investigate systematically, critically, and logically so that students can find their own understanding of the concept of the material, students will have knowledge, attitudes, and skills as a form of change behavior [8].

All of the syntax in discovery models train students to socialize, interact with friends and teachers, achieve satisfying learning outcomes. Therefore, researchers are interested in

conducting research on "Analysis of Increasing Activities and Learning Outcomes through Learning Model Discovery of Students in Class XI MIA SMA Negeri 11 Makassar Salt Hydrolysis Main Material" which is described in the formulation of the problem. Is there an increase in activity and learning outcomes students at each meeting in learning salt hydrolysis using discovery learning model

2. Methodology

This research is a quantitative descriptive study that describes the level of activity and learning outcomes of students' salt hydrolysis. Descriptive research aims to systematically describe a fact. This research was conducted at SMA Negeri 11 Makassar, which was conducted in the 2020/2021 school year. from June to August 2020 with consists 30 students as a subject of class XI IPA.

The instruments are activity observation evaluation questions and an essay questions.The data collection by observation (online). The observation material in this study consists of learning models, activities, and chemical materials for salt hydrolysis. The observations in this study were processed in the form of scores from 1-4 with different criteria. The collected data is processed using the value interval from the numbers 1 = not good, 2 = good enough, 3 = good, and 4 = very good. The description of the activeness score and learning outcomes during the learning process, is shown in Table 1.

Table 1. Description of Student Activity Scores During Learning

No	Score (%)	Criteria
1	0 – 25	Not good
2	26 – 50	Pretty good
3	51 – 75	Good
4	76 – 100	Very Good

The results of activities and learning outcomes that are measured by the percentage value of the activity and the expected learning outcomes, are expressed as the total score of the activeness of students which can be calculated by the following equation:

Analysis of activity data was carried out at each meeting descriptively by determining the scores for each aspect and indicators of the activities carried out by students, then creating activity categories consisting of very active, active, moderately active and less active.

The students achievement and are analyzed descriptively qualitatively by explaining the results and determining the achievement by calculating each indicatoor displayed in the form of a persentage of the learning outcomes of eac meeting. The completeness category applied chemistry is if a value 75 is said to be

completeness category and a value <75 is said to be incomplete

3. Results and Discussion

3.1. Descriptive statistical analysis data of student learning activities

The data on table 2 shows that the average value of student activity at each meeting has increased. This supports that there is an increase in the learning activities of students who are taught using discovery learning model [9]

Table 2. Descriptive Statistics of Students' Learning Activities

Statistic Descriptif	Statistics value		
	Meeting 1	Meeting 2	Meeting 3
Number Of Sample	30	30	30
Maximum Value	82,5	92,5	97,5
Lower Value	65	70	77,5
Average value	74,4	82,7	87,03
Median	76,5	85,5	86,85
Modus	79.83	90,5	87,74
Varians	35,01	62,23	16,26
Deviasion Standars	5,92	7,89	4,03

Table 3. Percentage of Student Activities on Discovery Learning

Indicator	Syntax	Meeting 1		Meeting2		Meeting 3	
		Percentage	Category	Percentage	Category	Percentage	Category
Visual	1	85.83	VA	90.00	VA	93.33	VA
	2	85.00	VA	88.33	VA	93.33	VA
Writing	2	85.00	VA	88.33	VA	92.50	VA
	3	77.50	A	82.5	VA	90.00	VA
	4	75.00	A	78.33	A	88.33	VA
Oral	4	60.00	AE	70.00	A	79.17	A
	5	58.33	AE	71.67	A	80.00	A
Listening	4	72.50	A	80.00	A	85.00	VA
	5	72.50	A	78.33	A	80.00	A
Menthal	6	73.33	A	82.50	VA	86.67	VA

Information:

Sintax 1= stimulation, 2= problem identification, 3= Collecting data, 4= Processing Data, 5=Verification, 6 = generalisation

Category: VA= Very Active, A= Active, AE= Active enough, LA= Less active

Data on table 3. shows at the first meeting that only of the visual and writing indicators in the stimulation, problem identification and datacollection are in very active category. This stimulation presented a contextual description of chemical changes in everyday life, than most of the students seemed to focus on watching the power point slides displayed and wrote directly what were they understood according to their own understanding [10]. They are also active in studying literature to answer problem formulations from several sources such as the internet and textbooks. The other in an active category. Some students who are just looking for information but don't record it, just carry out discussions without recording the results of their group discussions, students who feel reluctant to express their opinions during group discussions, embarrassed to convey the results of their group discussions in front of other groups and making the final conclusion of learning.

The second meeting on visual, writing, listening and menthal indicators gets a very active category on stimulus, data collection and generalization syntax. The number of student recording the information that they get from the internet and printed books to answer problems that have been formulated has increased [11]. The same type of activity was also achieved in this meeting.

The third indicator oral is an increase from being quite active to being active. This can be seen from students who are increasingly courageous to express their opinions or responses during group discussions so that learning at the second meeting is more responsive.

Table 4. Percentage of Student Activity Categories in Each Indicator.

Indikator	Meeting 1				Meeting 2				Meeting 3			
	VA	A	AE	LA	VA	A	AE	LA	VA	A	AE	LA
Visual (Stimulus)	43	57	0	0	60	40	0	0	27	73	0	0
Visual (Collecting Data)	40	60	0	0	53	47	0	0	27	73	0	0
Writing (Identif of Problem)	40	60	0	0	53	47	0	0	70	30	0	0
Writing (Collection Data)	23	67	10	0	33	63	3	0	57	43	0	0
Writing (Processing Data)	23	53	23	0	30	53	17	0	43	57	0	0
Oral (Processing Data)	3	63	33	0	20	40	40	0	27	73	0	0
Oral (verification)	3	27	70	0	20	47	33	0	20	80	0	0
Listening (Procesing Data)	30	30	40	0	43	33	23	0	30	70	0	0
Listening (verification)	23	43	33	0	20	47	33	0	33	63	3	0
Menthal (Generalisasi)	20	50	30	0	37	57	7	0	47	53	0	0

The indicator with the lowest achievement is oral, the ability of students to argue in the discussion process still needs to be honed. However, the percentage of student activity at each meeting has increased. Discovery learning is able to lead students to be more active in the learning process, students can think reflectively after verifying the results of the discussion with group friends, as [12] which states that discovery learning makes teachers act as guides by providing opportunities for students to learn active and reflective.

3. 2 Description of Student Learning Outcomes

The result data obtained from descriptive statistical analysis of student learning activities has high value, 95,5 (very completely) and lower value, 60 (uncompletely) and the average value is 78,70 on completely category. Connected to table 5, it show s the high frequency of student in complete category (73,33%)

Table 5. Categories of Students' Learning Outcomes

Category	Value	Frequensy	Percentage
Complete	≥75	22	73.33%
Not Complete	<75	8	26,67%

Students are not accustomed to learning by themselves to construct their understanding, not accustomed to learning in independent learning.

Corresponding to table 6 shows that there two indicators that are complete and three indicators that are not complete. Students are still not careful in distinguishing the concept of hydrolyzed salt. they are often reversed applying the concept.

The table 7 show an increase in learning outcomes indicators obtained satisfactory completeness. The post-test score for questions that included the third and fourth indicators obtained a percentage of completeness that increased compared to the first meeting. For the fifth indicator was also an increase in the post-test and evaluation of learning outcomes of .The students who have good activities are also able to get good post test and evaluation

scores on the indicators at each meeting. This was supports students who have good discovery activities are able to lead students to answer questions.

Table 6. Percentage Indicator Completeness

Indicator	Frequency	Percentage	Category
Understand the principle of hydrolysis reaction	24	80,00%	Complete
Analyze the salts that undergo hydrolysis	14	46,67%	Not complete
Write down the equation for the hydrolysis reaction	14	46,67%	Not complete
Determine the hydrolysis constant and pH of the hydrolyzed salt solution.	27	90,00%	Complete
Determine the graph of the relationship between changes in pH values in acid-base titrations to explain the nature of the hydrolyzed salt.	24	90,00%	Complete
Completeness Average		60,00%	

Table 7. Post Test Category for Students in Each Meeting

Category	value	Meeting 1		Meeting 2		Meeting 3	
		Indicator 1 and 2		Indicator 3 and 4		Indicator 5	
		F	%	F	%	F	%
Complete	≥75	19	63,33	23	76,67	27	90
Not Complete	<75	11	36,67	7	23,33	3	10

4. Conclusions
Based on the research result. It can be concluded tha the activity and learning result
Activity and learning outcomes of salt hydrolysis of class XI SMA 11 Makassar has increased at each meeting.

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